

Life History of Pacific Coast Halibut

By William F. Thompson.

The Provincial Fisheries Department of British Columbia has for a number of years devoted considerable attention to the investigation of the life history of a number of the chief fishes of the Pacific. Already important contributions to the life history of the salmon of the Pacific have been made by experts retained by that department.

The following preliminary notes upon certain phases of the life history of the halibut by Will F. Thompson, of Stanford University, have been furnished by the Provincial Department:

"The importance of the halibut as a food fish and the imminent danger that the supply may become seriously diminished, if not exhausted, on both our coasts, has aroused special interest in its present abundance and distribution and in all the facts of its life history. Fishermen and dealers are aware that the best known halibut banks are becoming seriously depleted by over-fishing. Their catches are each season brought from more distant banks, and it has become alarmingly evident that the supply is limited and is rapidly decreasing. It is beyond question that if this important source of food is not to be largely lost to the public some protection must be extended to the species in the near future. To effect this rationally and without undue disturbance to the industry complete knowledge of the life history of the halibut must be obtained.

"In consideration of these facts, the Fisheries Department of the Province of British Columbia has decided to prosecute an inquiry into the growth history, food, seasonal distribution, period of fertility, the development and all other phases necessary to an understanding of the life of the halibut. To this field the writer has been assigned during fishing fleet to the banks of British Columbia and Alaska. So little is known of the halibut, based on adequate data, that it seems advisable to place here on record certain of the facts recently ascertained, pending a more detailed report to be presented later.

"1. In determining the age of the halibut the writer has made use of the otoliths, as has been done with such signal success with the European plaice. Such minor uncertainty as still attaches to the interpretation of the various parts of the halibut otolith will not seriously affect the truth of the comparison of male and female growth here given. One hundred and fifty specimens were utilized in the series from which the sixty of the following tables were selected:

| Year of Life— | Sex | Body Length to Caudal Base (Average) | Number of Specimens |
|-------------------|-------------|--------------------------------------|---------------------|
| VIII. | Male..... | 31.1 inches | 11 |
| VIII. | Female..... | 36.1 inches | 24 |
| XII. | Male..... | 37.1 inches | 6 |
| XII. | Female..... | 42.0 inches | 6 |
| XIV. and XV. | Male..... | 40.2 inches | 5 |
| XIV. and XV. | Female..... | 52.6 inches | 5 |
| XIX. | Female..... | 65. inches | 3 |

It will be noted that the females grow more rapidly and attain a larger size than do the males. These results corroborate general beliefs which have been entertained on scanty evidence. It has long been thought that halibut reach an age of about twenty years (Joyce, in Alexander, Preliminary Examination of Halibut Fishing Grounds of the Pacific Coast, Bureau of Fisheries Document No. 763); and the differing size of males and females has been known in a similar way to halibut fishermen of the Atlantic (See G. Brown Goode, Fisheries and Fishing Industries of the United States, Sec. 1, 1884, p. 189).

"This difference in rate of growth and final size of males and females, which it is the sole purpose of the above

table to indicate, has been corroborated in the following ways:

"(a) Tables which have been compiled from over two thousand specimens show the longest male which was examined to have been 47 inches in body length and the next longest 46, while the two longest females were 69 and 65 inches respectively.

"(b) The graphic curves constructed for each catch show the male curve ceasing in a normal way between lengths of 40 and 44, but that of the females ceases at about 60 inches.

"(c) The average length of the males in any catch is constantly less than that of the females, as instanced in one catch of 150 specimens taken near Huxley Island, Queen Charlotte group:

| Sex— | Number of Specimens | Average Length |
|--------------|---------------------|----------------|
| Males..... | 71 | 34.8 ins. |
| Females..... | 79 | 38.3 ins. |

This difference is not strictly the same as that of the age lengths, for the lower limit of size in this case is determined by the size of hook used, whereby a larger percentage of the smaller females is captured than of the smaller males. This is, incidentally, the reverse of what is usually considered good practice in fish conservation. It may also be suggested here that a size limit of 42 inches (body length) would allow the escape of a large number of mature females with the loss of but few males.

"2. The fact that one or the other of the sexes may predominate at a given time is one of the most noticeable features of the halibut banks. It will suffice to give three representative instances: A catch from which fifty were taken in sequence as brought over the side of the vessel, off Yakutat, Alaska, June 28, 1914, showed 48 females and 2 males, respectively, 96 and 4 per cent. This was rendered more striking by the fact that the two males were taken on contiguous hooks and were only 27 inches in length as compared with an average of 40.1 inches for the females. On August 12, 1914, in 80-90 fathoms, near Kodiak, Alaska, 94 specimens gave 32 per cent. females and 68 per cent. males. On September 4, 1914 (in 90 fathoms, off Middleton Island, Alaska) the proportion was 88 per cent. females and 12 per cent. males. This proportion was sometimes found to vary widely on successive days.

"3. As the halibut boats which the writer accompanied visited banks along both the British Columbian and Alaskan coasts, opportunity was afforded to compare fish from widely separated districts. It became at once apparent that differences existed. Such differences were observed in the relative size of the parts of the fish and in other respects. Thus, as shown in the following table, the length of the head in Alaskan material is proportionately greater in that from British Columbia. The head lengths are given in terms of hundredths of the body length:

| Sex— | Kadiak Island | |
|------------------|------------------|-------------|
| | No. of Specimens | Head Length |
| Male..... | 80 | 29.33 |
| Female..... | 107 | 29.07 |
| Middleton Island | | |
| Male..... | 74 | 29.39 |
| Female..... | 148 | 29.16 |
| Queen Charlottes | | |
| Male..... | 85 | 26.8 |
| Female..... | 146 | 26.89 |